

PowerHub 7000/8000 Release Notes

Software Versions

PH_7PE_FT_4.1.x PH_8PE_FT_4.1.x

> MANU0323-02 Rev. A - 6/26/98

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1.0 General Description of Software Release

These release notes highlight the features in the *PowerHub ForeThought* software, version PH_7PE_4.1.x for the *PowerHub* 7000 and PH 8PE 4.1.x for the *PowerHub* 8000.

2.0 Problems Fixed

The following problems in software release FT_4.0.x have been fixed in FT_4.1.x:

- If the default route of a PowerHub was set to itself, a host trying to use the router as a gateway got an PowerHub login prompt. This has been fixed so that if the default is set to itself, the PowerHub ARPs.
- The index parameter (lecIndex) is now saved when an elan add command is issued.
- The PowerHub did not forward 4050 byte-size FDDI frames over LANE with mtu of 4544.
 The PowerHub now supports byte sizes of 4500 in PowerHub 8000 and 4050 in PowerHub 7000.
- AppleTalk zone filter is now saved in the configuration. They no longer need to be added after each reboot.
- Issuing the 'ipx cache' command in FT_4.0.x caused pings to the PH 8000 to become very large, displaying all the entries at one time. It now displays 32 entries at one time before checking for threads.
- In FT_4.0.x, the Power Cell would get hung with 16 les/bus pairs and 32 lec's configured when the fiber was pulled and then re-inserted. This problem has been corrected.
- In FT_4.0.x, SNMP failed to set alLinkStatsCollect when trying to enable statistics. This problem has been fixed.

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3.0 System Requirements

Refer to the *PowerHub Hardware Reference Manual* (MANU0166-01), *PowerHub Software Reference Manual* (MANU0167-01), *PowerHub ATM Software Reference Manual* (MANU0271-01) and the *PowerHub Filters Manual* (MANU0168-01) for detailed information on the hardware requirements, software capabilities and on configuring filters for the *PowerHub* 7000 and 8000.

3.1 Firmware Requirements

Table 1 lists the firmware, as reported by the ver all command, required to take advantage of the new software and hardware features:

ModuleFirmwarePacket Engine 17pep-2.5.8 (s1.90)Packet Engine 28pep-1.2PowerCell ATM Module7atmp-1.2 (s1.7)FDDI Module7fp-1.13 (s1.13)

Table 1 - Recommended Firmware

Table 1 - Recommended Firmware

Module	Firmware
Fast Ethernet Module	7fep-1.2 (s1.7)

3.2 Memory Requirements

Table 2 lists the minimum memory requirements necessary to properly run version 4.1.x of PowerHub *ForeThought* software.

Table 2 - Minimum Memory Requirements

Module	Memory Required
Packet Engine 1 (PowerHub 7000)	24MB
Packet Engine 2 (PowerHub 8000)	32MB
PowerCell ATM Module	8MB

If upgrading an existing PowerHub 7000, contact FORE Systems TAC for the required firmware or hardware upgrades, as required, and the appropriate upgrade procedures.

3.3 Packet Engine 2 (PE2)

The Packet Engine 2 (PE2) is the second generation *PowerHub* Packet Engine. The PE2 contains four processors that share the load in processing traffic through the PowerHub. The processors in the Packet Engine contain the bridging and routing engines that intelligently examine packet headers, modifying them as required for routing. When a non-intelligent Network Interface Module (NIM) receives a packet from one of its ports, it places the packet on the Packet Channel Backplane and transfers it directly to the shared packet-buffer memory in the Packet engine.

The Main CPU (MCPU) of the PE2 examines the source and destination addresses in the packet and determines which segment(s) the packet needs to be forwarded to and the modifications, if any, that need to be made to the packet. After any necessary modifications are performed, the Input/Output Processor (IOP) queues the packet for transmission on the appropriate destination port(s).

The PE2 is also responsible for maintaining complete routing and bridging tables. Caches of route and bridge tables are distributed to intelligent NIMs which make forwarding decisions locally and use the IOPs to queue packets to the appropriate NIM. The major features of the PE2 are:

- Supports all currently supported PowerHub NIMs.
- Utilizes four 100/150MHz RISC (64bit internal-32bit external) processors, each with specialized functions: two MCPUs and two IOPs.
- Supports a four channel backplane for a peak bandwidth of 3.2 Gbps. These high-speed channels are implemented and controlled through the incorporation of ten proprietary ASIC devices.

The PE2 supports up to 128 segments, ships with 32MB of dynamic random access memory (DRAM) plus 1MB of Descriptor memory and a 10MB Compact Flash Card for system file storage and requires a minimum of two Power Supply modules.



The PE2 must be inserted in slot 5 of a 5-slot 2-packet channel system, slot 5 of a 10-slot, 4-packet channel system or slot 10 of a 15-slot system.

3.4 Chassis

The *Powerhub* 8000 is available in a 5-slot, 2-packet channel chassis and in a 10- and 15-slot, 4-packet channel chassis configuration. The 10-slot can accommodate 10 *PowerHub* interface modules (one PE2 and nine NIMs while the 15-slot accommodates up to 15 *PowerHub* interface modules (one PE2 and 14 NIMs). The modules can be of any combination of available NIMs, with the exception of the 15-slot chassis, which can only have 10 INIMS. Refer to the *PowerHub Hardware Reference Manual* for specific configuration related information. The *PowerHub* 8000 chassis, both 10- and 15-slot versions, contain four Power Module slots. Refer to *Section 5*, *Configuration Restrictions* for information on restrictions on configuring the PowerHub 7000 or 8000.

3.5 Four-Channel Backplane

The Four-Channel Backplane contains four packet channels. Each of these packet channels supports up to 800Mb/s of packet data providing an aggregate bandwidth of 3.2Gb/s. The four-channel backplane supports the Network Interface Modules (NIMs) described in the following paragraphs.

3.5.1 Network Interface Modules

The following Network Interface Modules (NIMs) are supported:

- PowerCell 700 ATM module
- Single, Dual, Universal Single and Dual FDDI modules
- FDDI Concentrators
- 6x1 (6x1FE) Fast Ethernet module
- 6x1, 10x1FL, 13x1, 4x4, 4x6, and 16x1 Ethernet modules

3.5.2 PowerCell 700 ATM Module

The PowerCell 700 ATM module can support up to two OC-3 fiber or UTP ATM Media Adapters (AMAs). When two AMAs are installed, one is configured as a primary port while the other acts as a backup port in the event of a failure in the primary. This provides for redundancy on the ATM ports.

3.5.3 FDDI Modules

The following FDDI modules and Media Adapters are supported:

- Single and Dual FDDI; (available with multi-mode MIC connectors and single-mode ST connectors)
- Universal Single and Dual FDDI; (available with the same connector types as Single and Dual FDDI modules)
- 1x6 and 1x16 FDDI Concentrators

3.5.4 Fast Ethernet Modules

The following Fast Ethernet modules and Media Adapters are supported:

• 6x1FE (six Fast Ethernet interfaces in the form of individually installed Fast Ethernet Media Adapters (FEMAs); the FEMAs are available with 100Base-TX, 100Base-FX (ST) and 100Base-FX (SC) single mode connectors.

3.5.5 Ethernet Modules

The following Ethernet modules and Media Adapters are supported:

- 6x1 Universal Ethernet Module (UEM); (provides six slots for installation of Ethernet Media Adapters (EMAs)). Any combination of the following EMA types can be installed on the UEM: AUI (10Base-5), 10Base-FL (FOIRL-compatible), 10Base-FB, BNC (10Base-2), MAU (Media Access Unit) and 10Base-T (UTP).
- 10x1 10Base-FL (ten independent 10Base-FL segments; connection for each segment is provided by multimode ST connectors).
- 13x1 (twelve 10Base-T connections and one slot for a FEMA; the FEMA types are the same as those for the 6x1FE).
- 16x1 (sixteen independent 10BAse-T segments; connection for each is provided by individual RJ-45 connectors).
- 4x4 Microsegment Ethernet repeater (four independent 10Base-T segments; each segment
 is further divided into four ports and connection to each port is provided by individual RJ45 connectors).
- 4x6 Microsegment Ethernet repeater (four independent 10Base-T segments; each segment is further divided into six ports and connection to each port is provided by connections in a 50-pin Champ-style connector).

3.6 500Watt Power Module

A 500Watt Power Module supports the NIMs installed in the PowerHub 8000 chassis. The PowerHub 7000 uses the 283Watt Power Module. It is possible, depending on configuration and traffic load, to run a 15-slot chassis with one 500Watt Power Module. It is recommended that two Power Modules be installed for load-sharing and redundancy. Load-sharing and redundancy reduce the chance of system failure in the event of the loss of a single Power Module.

3.7 New User Interface Subsystems

The commands to exercise PowerHub software features are grouped into subsystems. Each *subsystem* contains commands that pertain to a particular aspect of PowerHub configuration or management. To display a list of the subsystems available in software version PH_FT_4.1.x on-line, issue the subsystems (or ss) command. Issue the help (or?) command to display a complete list of commands.

3.8 System Management Features

This section describes the various management features in the PowerHub software. The focus of this section is on management of the PowerHub itself, rather than configuration and management of network interfaces.

3.9 Asynchronous Transfer Mode (ATM) Protocol Support

Additional ATM protocol support for Classical IP (CLIP), CLIP Permanent Virtual Channels (CLIP PVC), FOREIP, LANE services, and RFC1483 Encapsulation Bridged and Routed has been added. These additional ATM protocols provide additional flexibility when configuring ATM connections.

3.10 Multiprocessor Optimization

Multiprocessor Optimization minimizes the latency caused in normal packet forwarding functions due to the processing of management events. By moving these processing-intensive functions to a separate MCPU, the latency of packets in the fast path can be kept to a minimum.

3.11 Multiple Boot Sources

With the new software architecture the PowerHub 7000 can be configured to boot from floppy disk or Flash Memory. The PowerHub 8000 can be configured to boot from the Compact Flash Card, or TFTP/BOOTP file server. Configuring a boot order in NVRAM ensures against failure of the primary boot source.

CAUTION



If you are using PROM version 1.2 on the PowerHub 8000, please note that although the PowerHub 8000 cannot boot from Flash Memory, it will accept the nvram set bo m command specifying it to boot from Flash Memory. However, specifying the incorrect boot device sets the NVRAM so that the card does not boot after a reset or power cycle. The correct device names are n (net), and f (Flash Card).

3.12 DOS/UNIX-Like Command-Line Interface

The PowerHub is managed using DOS/UNIX-like line commands. These commands are issued from a management terminal attached either directly through a TTY connection or indirectly through an inband (TELNET) connection.

3.13 Local File-Management System

The PowerHub software provides global commands to display, copy, rename, and remove files stored on the Compact Flash Card. Checksums of files can be calculated, directory and volume information can be displayed, and, if necessary, the Compact Flash Card can be reformatted.

3.14 Support for Concurrent Command-Line Sessions

Four concurrent command-line management sessions can be opened simultaneously on the Power-Hub. The primary session is always the session on TTY1, but a second TTY session can be opened on TTY2. In addition, up to two TELNET sessions can also be opened.

3.15 System Configuration Files

This section describes that users can preserve configuration changes they affect through software commands by saving the changes in a PowerHub configuration file. If changes are saved to the cfg file, they are automatically applied following a software system reboot, provided the cfg file is present on the designated boot device.

3.16 Session Parameter Files

The PowerHub software provides software commands to modify parameters that control user sessions. These parameters include scroll control, TELNET control characters, command aliases, and timed commands. Changes to the defaults for these session parameters are lost when the session is closed.

Changes to session parameters can be saved in an environment file. At any time during a user session, the environment file can be read in (loaded) at any time thus reinstating the session parameter changes stored in the file.

If an environment file is saved under the filename root.env, it is automatically loaded whenever the system is logged into with root status. Likewise, if an environment file is saved under the filename monitor.env, the environment parameters in that file are automatically loaded when logging on with monitor status or the user level is changed from root to monitor during a session.

3.17 Automatic Segment-State Detection

Automatic Segment-State Detection is by default enabled and automatically senses when a link (or something configured on the link) is "bad" or "down." When a "bad" or "down" link is detected on a particular port, the state of the segment is reflected in the software's interface tables. *ForeView* Network Management software allows enabling or disabling of link types on a particular port.

3.18 Segment Statistics

The PowerHub software displays access method and protocol statistics related to segment and packet activity. For example, state-change statistics for individual segments can be displayed to see how many times a particular segment has gone up or down since the software was last loaded. Statistics related to the protocols are briefly described in Section 3.27.

3.19 Traffic Monitoring

The PowerHub software can monitor port activity at regular intervals. For example, packet activity or packet errors and collisions on a particular port can be monitored and the statistics graphed.

3.20 Virtual LANs (VLAN)

A VLAN is a collection of segments that share the same group name or protocol interface address. Bridging segments are a Layer-2 VLAN. A Layer-2 VLAN is created when a bridge group is created. The PowerHub software comes with a default bridge group called <code>default</code> that contains all the PowerHub segments.

A Layer-3 VLAN can be created by assigning the same IP, IPX, or AppleTalk interface address to multiple segments. When the PowerHub software determines a packet is to be sent to a Layer-3 VLAN assigned to multiple segments, the software forwards a copy of the packet on each segment. From a physical standpoint, when this happens a separate packet has been sent out to each physical interface; however, from a logical standpoint, the forwarded packet has been forwarded onto its single destination network or subnet, irrespective of how many physical interfaces that network or subnet is configured on.

3.21 Bridging and Routing Features

The **bridge** subsystem contains commands for configuring and managing the PowerHub system as an IEEE 802.1d bridge. Up to 32 network (bridge) groups can be defined, each containing any subset of PowerHub segments.

3.22 Bridge Table and Bridge Cache

The software maintains a bridge table containing the MAC-layer hardware addresses of devices to which the PowerHub is able to bridge packets. The software maintains the table by automatically adding new entries and deleting unused entries. In addition, individual entries, including entries to support multi-homed hosts can be added or deleted.

An example of the bridge table is shown below. Although only a handful of bridge entries are shown in this example, the bridge table usually contains many entries.

```
Bridging table (aging time = 60 minutes)
     Ethernet-address Seg Rule Flags
     00-00-00-00-00-00 01
                             none
     00-00-c0-ea-9f-17 01
                            none
    08-00-20-10-19-ac 08
                            none
    00-00-c0-ed-61-4a 01
                            none
     08-00-20-0c-5a-48 08
                             none
     02-cf-1f-90-40-23 01
                             none
     08-00-20-0c-3a-a2 02
    08-00-20-0c-5a-d2 08
                            none
                                  aged
     ff-ff-ff-ff-ff-ff --1
                             none
                                  permanent bmcast
```

In addition to the bridge table, a *bridge cache* of the most recently used source-destination pairs is maintained. A *source-destination pair* contains the packet's source and destination MAC-addresses. The cache provides a fast path for the bridging software and gives an at-a-glance view of current bridging activity. The bridge cache can be displayed to show at-a-glance the source-destination pairs that are frequently being used.

3.22.1 IEEE 802.1d

The PowerHub can be used "right out of the box" as an IEEE 802.1d Bridge. The designation 802.1d refers to the IEEE committee number that came up with the spec for this type of bridge. For more information regarding IEEE 802.1d bridging, refer to RFCs 1493 and 1525.

3.22.2 Spanning-Tree

The PowerHub bridge software includes implementation of the IEEE 802.1d Spanning-Tree algorithm. When enabled, the software identifies and "breaks" loops in the network without requiring configuration changes. Commands in the **bridge** subsystem allow fine-tuning of Spanning-Tree parameters to fit the network.

3.22.3 IPX Translation Bridging

IPX translation bridging lets the user configure one or more IPX networks that span across FDDI and Ethernet segments using different packet encapsulations. This type of bridging is different from 802.1d bridging, which bridges packets based on the MAC-layer hardware address of the devices in the network. IPX translation bridging is used only in IPX networks.

3.23 IP Routing

Commands in the <code>ip</code> subsystem allow the configuring of segments for IP routing. Using <code>ip</code> commands, IP interfaces can be assigned to individual segments. The IP routing software also supports IP VLANs, enabling a single IP subnet that spans multiple segments to be defined. The following subsections describe major features of the <code>ip</code> subsystem.

3.23.1 RIP (Routing Information Protocol)

The ip/rip subsystem commands are available to implement standard Routing Information Protocol version 2 for exchanging TCP/IP route information with other routers. Using commands in this subsystem, RIP parameters such as talk and listen can be configured on a segment-by-segment basis. Statistics for RIP packets can also be displayed.

3.23.2 Open Shortest Path First (OSPF)

The ip/ospf subsystem contains commands that allow the PowerHub to be configured as an OSPF router. OSPF (Open Shortest Path First) is a routing protocol that enables each participating router to use a topological map of the network to route packets. OSPF routers exchange route information using LSAs (link-state advertisements). An LSA is a packet that reports the link states (up or down) of router interfaces that are attached to devices in the OSPF network.

3.24 AppleTalk Routing

The atalk subsystem allows configuring PowerHub segments for AppleTalk Phase-2 routing. AppleTalk zones and interfaces and ping AppleTalk nodes can be defined.

3.25 IPX Routing

The PowerHub software allows the PowerHub to be configured and managed as an IPX router. In addition, the PowerHub software provides management information about IPX routes and servers through implementation of IPX RIP (Routing Information Protocol) and SAP (Service Advertisement Protocol). RIP or SAP talk and listen can be selectively enabled on a per-segment basis to control the flow of RIP and SAP updates in the network.

3.26 DECnet Routing

The dec subsystem contains commands to configure the PowerHub to perform DECnet Phase IV routing. Depending upon the network configuration, the PowerHub can be configured to function as a Level-1 or a Level-2 router. DECnet statistics for the PowerHub (in its capacity as a DECnet node) and for the individual segments configured as DECnet interfaces can be displayed.

3.27 Route Protocol Statistics

Statistics can be gathered and displayed for the following Internet routing protocols:

- AppleTalk
- Bridge
- DECnet
- IP
- IP/MCAST
- IPX

- OSPFv2
- RIPv2
- SNMP
- TCP
- TCP/IP

3.28 Security Filters

Filters can be defined and applied to PowerHub segments or protocol interfaces to control the traffic sent and received on the segments or interfaces. The following types of filters can be defined and applied:

- Bridge filters
- Host (TCP) filters
- IP filters
- IP route filters (RIP and OSPF)
- AppleTalk filters
- IPX RIP and SAP filters

4.0 Network Management Features

The PowerHub management environment provides comprehensive support for SNMP, as well as local RS-232 and Telnet console support. FORE Systems *ForeView* graphical network management software provides true point-and-click device configuration and runs on a variety of popular management stations.

4.1 Network Management System (NMS)

The NMS manages the PowerHub by sending a request to a software module, or agent, to change the value of one or more variables on the device. For example, an agent reports data such as the number of incoming and sent packets, or the number of dropped packets on that device. Then, the managed device and the NMS use Simple Network Management Protocol (SNMP) as the common protocol language to exchange the information requested by the NMS.

4.1.1 Management Information Base (MIB) Agents

MIBs contain the definitions of the resources (represented by managed objects within the MIB) that are managed by a network management system (NMS). The managed object has properties that hold values such as PowerHub routing table information, error counters, and so on.

4.1.2 SNMP Traps

Traps are asynchronous messages sent by an SNMP agent to the NMS. Traps can be any sort of message but usually tend to be reports of error conditions such as a network link going down. Traps provide the NMS immediate notification of extraordinary events on the network so it can respond quickly to the event. The following list describes SNMP traps available in this release.

- ATM Linkup
- ATM Linkdown
- ATM Switchover

- ATM Bootup
- ATM Fault
- Spanning Tree New Root
- Spanning Tree Topology Change
- System Power Supply Failure
- Board Failure
- FDDI Ring Wrap

4.1.3 ForeView

FORE Systems *ForeView* is a graphical-based management application providing a simplified tool for managing the PowerHub. With a point-and-click interface, *ForeView* provides access to PowerHub functions at both system- and segment-level. *ForeView* allows monitoring of errors, controlling the PowerHub, bridge, and routing configuration parameters, and the ability to display, print, and save statistics.

ForeView software integrates the PowerHub system, bridge, and router features into a single application with access and control of all information from one location. The software also features fault management to troubleshoot, analyze, and monitor multiple Ethernet and FDDI segments using a single network analyzer.

PowerHub statistics are displayed in graphical formats, and the physical attributes of the managed PowerHub, such as model and segment type, are displayed on the front panel of a graphical representation of the PowerHub being managed. The graphical representation is displayed when *ForeView* is started. For more information on the *ForeView* Network Management application, refer to the *ForeView Network Management User's Manual*. The following tables list the software and hardware features available in this release.

5.0 Configuration Restrictions

5.1 Intelligent Network Interface Modules Limitation

The 15-slot PowerHub 8000 chassis can only support up to 10 Intelligent Network Interface Modules (INIMs).

5.2 Maximum Recognized Segment Count

The PowerHub 7000 and 8000 does not recognize segments over and above the maximum allowable supported segment count on a per chassis basis. The PowerHub 7000, utilizing the PE1, can support up to 96 segments regardless of the chassis installed. The PowerHub 8000, utilizing the PE2, supports 128 segments in the 5-, 10-, and 15-slot chassis configurations. Table 3 lists the maximum number of segments, per NIM type.

Table 3 - Maximum Segments per Network Interface Module

Network Interface Module	Maximum Segments
Universal Ethernet	6
16x1 Ethernet	16
4x4 Microsegment Ethernet	4
4x6 Microsegment Ethernet	4
6x1 Universal Fast Ethernet	6
10x1 Fiber Optic Ethernet	10
13x1 Ethernet	13
Single FDDI	1
Universal Single DAS FDDI	1
Dual FDDI	2
Universal Dual DAS FDDI	2
FDDI Concentrator 6-port	0
FDDI Concentrator 16-port	0
PowerCell 700 OC-3	32

5.3 FDDI Concentrators

Table 2.2 and Figure 2.3 of PowerHub Hardware Reference Manual, MANU0166-01, Rev A, November 7, 1997 are incorrect. In Table 2.2, change the FDDI Channel Location for the PowerHub 8000, 10-Slot, to read Slots 6-8 and 15-slot to read Slots 3-7 and Slots 11-13. Change the FDDI Channel, shown in Figure 2.3, to include Slots 6-8 on a 10-Slot and Slots 11-13 on a 15-Slot chassis. Table 4 lists the allowable slots to install a FDDI Concentrator Module.

ChassisSlot5-Slot 2-ChannelNone10-Slot 2-Channel3-710-Slot 4-Channel6-815-Slot 4-Channel3-7, 11-13

Table 4 - FDDI Concentrator Module Placement

5.4 Single- and Dual FDDI Modules Slot Restrictions

Table 5 lists the Single- and Dual-FDDI module slot restrictions in the PowerHub 8000 4-channel 10- and 15-slot chassis. Install FDDI modules only in those slots listed. Do not install FDDI modules in the Packet Engine 2 slots, 4/5 of a 10-slot and 9/10 of a 15-slot chassis.

Chassis	Slot
10-slot 4-channel	1-3, 6-10
15-slot 4-channel	1-8, 11-15

Table 5 - Single- and Dual-FDDI Module Placement

6.0 User Interface Cross-Reference

Table 6 through Table 10 were inadvertently omitted from the *PowerHub ATM Software Reference Manual, MANU0271-01*. They are included here to assist those users who are transiting from the old user interface command structure, used in software releases 7-2.6.4.x and earlier, to the new user interface command structure, used in PH_FT_4.1.x. A similar set of tables currently exist in the *PowerHub Software Reference Manual, MANU0167-01, Appendix A.*

Table 6 - ATM Subsystem Commands

Old User Interface Command	New User Interface Command
<pre>segment-showcfg sscf<seg- ment=""> all Shows configuration information for Power- Cell segment(s).</seg-></pre>	<pre>config [show] [s[egments]=]<seg- list> slot=<slot#> all Shows configuration information for Pow- erCell segment(s).</slot#></seg- </pre>

Table 6 - ATM Subsystem Commands

Old User Interface Command	New User Interface Command
ama-stats ast <slot> all Displays AMA statistics.</slot>	stats [show] active-ama aa <slot> all Displays AMA statistics.</slot>
ama-statsclear astc <slot> all Clears AMA statistics.</slot>	stats clear active-ama aa <slot> all Clears AMA statistics.</slot>
ama-show-linemode aslm <slot> all Display AMA line mode.</slot>	active-ama aa [show] [linemode lm] <slot> all Display AMA line mode.</slot>
ama-linemode-set alse <slot> <mode> Sets AMA line mode.</mode></slot>	active-ama aa cset linemode lm <mode> <slot> Sets AMA line mode.</slot></mode>
ama-set ase <slot> all <param/> <value> Selects which AMA card to be used as primary or backup.</value></slot>	active-ama aa cset p[rimary] b[ackup] <slot> all Selects which AMA card to be used as primary or backup.</slot>
ama-showcfg ascf <slot> a11 Shows AMA configuration.</slot>	aa show Shows AMA configuration.
<pre>segment-set sse <seg-list> all <param/> <value> [<param/> <value>] Specifies the protocol to be used.</value></value></seg-list></pre>	<pre>sset proto[col] <pre>cproto> <seglist> all <pre>cproto> = l[ane] c[lassical-ip] b[ridge-encap] f[ore-ip]</pre> Specifies the protocol to be used.</seglist></pre></pre>
segment-set sse <seg-list> all <param/> <value> [<param/> <value>] Associates a segment to a rate group.</value></value></seg-list>	<pre>sset rate-group rg 1 2 3 4 <seg- ment=""> all Associates a segment to a rate group.</seg-></pre>
rate-set rse < slot> < rate-group> < rate> Configures the rate group to a given rate.	rate-group rg cset < rate-group > < rate > < slot > Configures the rate group to a given rate.
rate-showcfg rscf <slot> all Shows rate group information.</slot>	rate-group rg [show] < slot> all Shows rate group information.
atm-vc-show avc <segment> all Displays all VCs which are active on specified ATM segment(s).</segment>	vc [show] <seglist> all Displays all VCs which are active on specified ATM segment(s).</seglist>

Table 7 - ATM/1483ENCAP Subsystem Commands

Old User Interface Command	New User Interface Command
br-encap-showcfg bscf <segment> Display RFC-1483 encapsulation statistics and other related information.</segment>	config [show] <seglist> all Display RFC-1483 encapsulation statistics and other related information.</seglist>
br-encap-set bse <segment> [<param/> <value>]] <state> <enl> Enables virtual channels.</enl></state></value></segment>	senable <seglist> Enables virtual channels.</seglist>

Table 7 - ATM/1483ENCAP Subsystem Commands

Old User Interface Command		New User Interface Command
br-encap-set bse <segment> <value>]] <state> <dis> Disables virtual channels.</dis></state></value></segment>	[<param/>	sdisable <seglist> Disables virtual channels.</seglist>
br-encap-set bse < segment> < value>]] < state> < dis> Sets up incoming virtual channel ID.	[<param/>	inpvc sset <vci> <seglist> Sets up incoming virtual channel ID.</seglist></vci>
br-encap-set bse <segment> <value>]] <state> <dis> Sets up outgoing virtual channel ID.</dis></state></value></segment>	[<param/>	outpvc sset <vci> <seglist> Sets up outgoing virtual channel ID.</seglist></vci>

Table 8 - ATM/LANE Subsystem Commands

Old User Interface Command	New User Interface Command
lec-showcfg lscf <slot> all Displays LEC configuration information for the PowerCell module.</slot>	lec [show] <slot> all Shows configurations of LEC associated to the specified slot(s)</slot>
elan-showcfg escf <elan-name> all Shows configurations of ELANs specified.</elan-name>	elan [show] <elan-name> all Shows configurations of ELAN.</elan-name>
elan-arptable eat	at [show] elan= <elan- name> addr=<mac-address> all Shows LE ARP table entries which map MAC addresses to ATM addresses of a given ELAN or MAC address.</mac-address></elan-
elan-arptableclear eatc	at clear <elan-name> all Clears LE ARP table entries of ELANs specified.</elan-name>
elan-vctable evt <elan-name> all Shows what VCs are being used on a specified ELAN.</elan-name>	vt [show] <elan-name> all Shows what VCs are being used on a specified ELAN.</elan-name>
bus-add buadd <elan-name> <slot> <businesses <a="" href="mailto:bus-add">bus-add [rate-group] Add a BUS <elan-name> to slot <slot> on Selector byte <businesses <a="" href="mailto:bus-SELbyte">bus-SELbyte> with packet forwarding out rate group [rate-group].</businesses></slot></elan-name></businesses></slot></elan-name>	bus add <bus-elan-name> <slot> <bus-selbyte> [[rg=]<rate-group>] [-type (ethernet token-ring)] [-mtu (1516 4544 9234)] Add a BUS <elan-name> to the specified slot with selector byte. <bus-selbyte> must be specified in hexidecimal. The <rate-group> defaults to 1.</rate-group></bus-selbyte></elan-name></rate-group></bus-selbyte></slot></bus-elan-name>
bus-del budel <elan-name> <slot> Delete BUS <elan-name> from slot <slot>.</slot></elan-name></slot></elan-name>	bus delete bus-elan-name> <slot> Delete BUS <elan-name> from slot <slot>.</slot></elan-name></slot>

Table 8 - ATM/LANE Subsystem Commands

Old User Interface Command	New User Interface Command
bus-stats bust <elan-name> all <slot> all Display statistics for specified BUSs on specified slots.</slot></elan-name>	<pre>stats [show] bus <service-name> all <slot> all Display statistics for specified BUSs on speci- fied slots.</slot></service-name></pre>
bus-statsclear bustc	stats clear bus <service-name> all <slot> all Clear statistics for specified BUSs on specified slots.</slot></service-name>
les-add leadd <elan-name> <slot> <les- SELbyte> <bus-selbyte> [rate- group] <bus-stm-address> Add an LES <elan-name> on slot <slot> with Selector byte <les-selbyte>.</les-selbyte></slot></elan-name></bus-stm-address></bus-selbyte></les- </slot></elan-name>	les add <les-elan-name> <slot> <service-id> [[rg=]<rate-group>][-type (ethernet token-ring)] [-mtu (1516 4544 9234)] Add an LES <elan-name> on slot <slot> with Selector byte <les-selbyte>. The associated BUS is specified by either the selector byte, <bus-selbyte>, or by specifying the full ATM address, <bus-atm-address>. If <bus-selbyte> is used both the LES and BUS are created and are co-located. <les-selbyte> and <bus-selbyte> must be specified in hexidecimal. The second usage requires the specification of an 8-digit Service Identifier (decimal notation or prefix with a "0x" for hex. notation). This ID will be used to construct an ATM address where the service can be located independent of the physical topology. Both the LES and BUS are created under this usage. The <rate-group> defaults to 1.</rate-group></bus-selbyte></les-selbyte></bus-selbyte></bus-atm-address></bus-selbyte></les-selbyte></slot></elan-name></rate-group></service-id></slot></les-elan-name>
les-del ledel <elan-name> <slot> Delete LES <elan-name> on slot <slot>.</slot></elan-name></slot></elan-name>	les delete < les-elan-name> < slot> Delete LES < elan-name> on slot < slot>.
<pre>les-stats lest</pre>	<pre>stats [show] les <service-name> all <slot> all Display statistics for specified LESs on speci- fied slots.</slot></service-name></pre>
les-statsclear lestc <elan-name> all <slot> all Clear statistics for specified LESs on specified slots.</slot></elan-name>	stats clear les <service-name> all <slot> all Clear statistics for specified LESs on specified slots.</slot></service-name>
les-showmember lesm <elan-name> all <slot> all Display MAC to ATM address mappings for specified LESs on specified slots.</slot></elan-name>	stats [show] member lesm <service- name> all <slot> all Display MAC to ATM address mappings for specified LESs on specified slots.</slot></service-

Table 8 - ATM/LANE Subsystem Commands

Old User Interface Command	New User Interface Command
elan-add eadd <elan-name> <segment> [<les-atm-address>] Associates an ELAN to a segment with an optional LES ATM address.</les-atm-address></segment></elan-name>	elan add <segment> <elan-name> [la <les-atm-address> lu <lecs-atm-address>] Associates an ELAN to segment with an optional LES ATM address or LECS ATM ADDRESS.</lecs-atm-address></les-atm-address></elan-name></segment>
elan-del edel <elan-name> Deletes any ELAN to segment association of a given ELAN.</elan-name>	elan delete < elan-name > Deletes any ELAN to segment association of a given ELAN.
elan-stats est <elan-name> all elan if all Shows ELAN specific (elan) or Interface spe- cific (if) statistics of the ELANs specified.</elan-name>	stats [show] elan < elan-name > all elan if all Shows ELAN specific (elan) or Interface specific (if) statistics of the ELANs specified.
elan-statsclear estc <elan-name> all Clears statistics of the ELANS specified.</elan-name>	stats clear elan < elan-name > all Clears statistics of the ELANS specified.
elan-set ese < elan-name> all < param> < value> [<param/> <value>] [<param/><value>]] Configures an ELAN.</value></value>	elan set <elan-name> all arp-aging aa <time> Configures the maximum time that the specified ELAN will maintain an entry in its ARP cache in the absence of a verification of that relationship. Min: 10 sec, Max: 300 sec, Default: 10 sec.</time></elan-name>
elan-set ese < elan-name> all < param> < value> [<param/> <value>[<param/><value>]] Configures an ELAN.</value></value>	elan set <elan-name> all bus-rate br <packets per="" second=""> Defines how many unknown packets per second the specified ELAN may send to the BUS. Min: 0 pps , Max: 10 pps , Default: 1 pps.</packets></elan-name>
elan-set ese < elan-name> all < param> < value> [<param/> <value>]] Configures an ELAN.</value>	elan set <elan-name> all control-timeout cto <time> Configures the time out period used for timing out request/response control frame interactions of the specified ELAN Min: 10 sec, Max: 600 sec, Default: 120 sec.</time></elan-name>
elan-set ese <elan-name> all <param/> <value> [<param/><value>] Configures an ELAN.</value></value></elan-name>	elan set <elan-name> all flush-tim-eout fto <time> Configures the time limit to wait for receiving an LE_FLUSH_RESPONSE after an LE_FLUSH_REQUEST has been sent. Min: 1 sec, Max: 6 sec, Default: 6 sec.</time></elan-name>

Table 8 - ATM/LANE Subsystem Commands

Old User Interface Command	New User Interface Command
elan-set ese < elan-name> all < param> < value> [<param/> <value>[<param/><value>]] Configures an ELAN.</value></value>	elan set <elan-name> all forward-delay fd <time> Configures the maximum time that the specified ELAN will maintain an entry in its ARP cache in the absence of a verification of that relationship, as long as Topology Change is true. Min: 4 sec, Max: 30 sec, Default: 15 sec.</time></elan-name>
elan-set ese <elan-name> all <param/> <value> [<param/><value>]] Configures an ELAN.</value></value></elan-name>	elan set <elan-name> all max-arp-retry mar <count> Defines the number of times the specified ELAN may send LE_ARP_REQUEST for a given frame's LAN destination. Min: 0, Max: 2, Default: 1</count></elan-name>
elan-set ese <elan-name> all <param/> <value> [<param/><value>] Configures an ELAN.</value></value></elan-name>	elan set <elan-name> all vcc-time-out vto <time> Configures the time out period used to release Data Direct VCC which has been idle for this amount of time. Min: 1 min, Max: 720 min (12 hours), Default: 20 min.</time></elan-name>
lec-set lse lu < lecs-atm-addr> Configures the LEC. If < lecs-atm-addr> is specified, the user configured LECS address is used.	lec cset lecs-addr <lecs-atm-address> <slot> all Configures the specified LECS to be used by the LEC of the specified slot. where <lecs-atm-address> is either valid atm address or "wka" which stands for well-known LECS ATM address.</lecs-atm-address></slot></lecs-atm-address>
lec-set lse lu enl dis Enables or Disables the use of LECS by the LE Client of the specified slot.	
lec-set lse state enl dis Starts or stops the LE Client of the specified slot.	
service-show sescf <elan-name> all <slot> all [les bus] Shows service configuration on specified slot.</slot></elan-name>	
elan-configure elco	

Table 9 - ATM/FOREIP Subsystem Commands

Old User Interface Command	New User Interface Command
<pre>foreip-statistics fst <segment> Display FORE-IP protocol statistics associated with <segment>.</segment></segment></pre>	stats [show] < seglist > Display FORE-IP protocol statistics associated with segment(s).
<pre>foreip-stats-clear fstc <segment> Clears FORE-IP statistics for the specified <seg- ment="">.</seg-></segment></pre>	<pre>stats clear <seglist> Clears FORE-IP statistics for the specified seg- ment(s).</seglist></pre>
foreip-set fse < segment > < param > < value > This command enable / disable FORE-IP protocol on the specified segment, only if the segment is not operating in that mode currently.	senable < <i>seglist</i> > Enables the use of FOREIP on the specified segment(s).
foreip-set fse <segment> <param/> <value> This command will enable/disable FORE-IP protocol on the specified segment, only if the segment is not operating in that mode cur- rently.</value></segment>	Disables the use of FOREIP on the specified
<pre>foreip-show-cache fsoc <segment> Display FORE-IP cache associated with <seg- ment="">.</seg-></segment></pre>	cache [show] < seglist> Sets up incoming virtual channel ID on specified segment(s).

Table 10 - ATM/CLIP Subsystem Commands

Old User Interface Command	New User Interface Command
<pre>clip-set clse state enl <segment> <param/> <value> [<param/> <value>]] Enables or disables classical IP on the specified segment.</value></value></segment></pre>	Enables the use of CLIP on the specified seg-
<pre>clip-set clse state dis <segment> <param/> <value> [<param/> <value>]] Enables or disables classical IP on the specified segment.</value></value></segment></pre>	Disables the use of CLIP on the specified seg-
clip-set clse as <segment> <param/> <value> [<param/> <value>]] Specifies the 20 byte ATM address of the ATM ARP server.</value></value></segment>	addr> <seglist></seglist>
clip-set clse aa <segment> <param/> <value> [<param/> <value>]] Configures the maximum time that an ATM ARP entry is kept without being used.</value></value></segment>	list>

Table 10 - ATM/CLIP Subsystem Commands

Old User Interface Command	New User Interface Command
clip-set clse at <segment> <param/> <value> [<param/> <value>]] Time to wait when connecting to an ARP server to detect that the attempt failed.</value></value></segment>	<pre>arp-conn-timeout at sset < seconds> <seglist> Time to wait when connecting to an ARP server to detect that the attempt failed. System will attempt to reconnect. Min: 5 sec, Max: 60 sec, Def: 10 sec.</seglist></pre>
<pre>clip-showcfg clsh <segment> all [-1] Shows the classical IP configuration for the requested segment(s).</segment></pre>	config [show] [local 1] <seg-list> all Shows the classical IP configuration for the requested segment(s). If "local" or "l" is specified, locally stored information on the packet engine will be displayed.</seg-list>
<pre>clip-stats clst <segment> all Shows the classical IP packet statistics for the requested segment(s).</segment></pre>	stats [show] <seglist> all Shows the classical IP packet statistics for the requested segment(s).</seglist>
clip-stats-clear clsc <segment> all Clear the classical IP packet statistics for the requested segment(s).</segment>	stats clear <seglist> all Clear the classical IP packet statistics for the requested segment(s).</seglist>
clip-arp-tbl clat <segment> all <ipaddr> all Shows ATM ARP table entry(ies) which map IP addresses to ATM address for the requested ATM segment(s).</ipaddr></segment>	arp [show] <ipaddr> all <seg-list> all Shows ATM ARP table entries which map IP addresses to ATM addresses for the requested ATM segment(s), This table also contains the mapping to the associated virtual circuit.</seg-list></ipaddr>
clip-arp-tbl-clear clac segment all Clears the ATM ARP table entries for the requested ATM segment(s).	arp clear <seglist> all Clears the ATM ARP table entries for the requested ATM segment(s).</seglist>

7.0 Known Problems

The following known problems exist in software version FT_4.1.x for the PH_7PE_4.1.x for the *Power-Hub* 7000 and PH_8PE_4.1.x for the *Power-Hub* 8000:

- 1. Traps not sent to network management system for FDDI operations change.
- 2. In a fully configured PowerHub 8000 (128 segments configured), last segment (segment 128) information is not displayed with atm config show segment command. Segment can be configured and ELAN information can be displayed.
- 3. No command similar to RIP CONTROL TYPE available in PH_FT4.1.x user interface.
- 4. When OSPF is used to do One-Arm-Routing between FOREIP and LANE, even though routes look updated when displaying the routing tables, connectivity can not be established between the end systems through the One-Arm-Router.

8.0 Contacting Technical Support

In the U.S.A., contact FORE Systems' Technical Support by any one of four following methods:

1. If access to the Internet is available, contact FORE Systems' Technical Support via e-mail at the following address:

support@fore.com

2. FAX questions to "support" at:

724-742-7900

3. Mail questions, via U.S. Mail, to the following address:

FORE Systems, Inc. 1000 FORE Drive Warrendale, PA 15086-7502

4. Telephone questions to "support" at:

800-671-FORE (3673) or 724-742-6999

Technical support for non-U.S.A. customers should be handled through the local FORE Systems distributor.

No matter which method is used for technical support, please be prepared to provide the serial number(s) of the product(s) and as much information as possible describing the problem or question.